Curriculum Vitae

Ayanna M. Howard

Jet Propulsion Laboratory, Mobility Systems Concept Development Section
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EDUCATION

Ph.D. *Electrical Engineering* (concentration in Robotics and Artificial Intelligence), University of Southern California, May 1999. Dissertation: *Recursive Learning for Deformable Object Manipulation*. Thesis advisor: Prof. George A. Bekey. *Minor in Computer Science*.

M.S. *Electrical Engineering*, University of Southern California, December 1994.

B.S. *Computer Engineering*, Brown University, May 1993.

M.B.A. (Masters of Business Administration, concentration in Strategy), Drucker/Ito Graduate School of Management, Claremont Graduate University, May 2005.

PROFESSIONAL

NASA's Jet Propulsion Laboratory, Pasadena, California **1993-present**

Deputy Manager – Strategic University Research Partnership Office, Office of Chief Scientist 9/03-present

Senior Robotics Researcher – Mobility Systems Concept Development Section 9/02-present

- *Cognizant Engineer:* research and design autonomy software based on human cognition for landing a robotic spacecraft safely on a remote surface, formation flying of multiple spacecrafts, and safe navigation of a planetary rover.
- *Task Manager:* responsible for state-of-the-art research development of an Artificial Intelligence software toolkit for interactive learning.
- *Deputy Manager:* responsible for managing science and technology research liaisons that establish and strengthen strategic relationships with leading universities. Provide direct input to Chief Technologist on technical projects and resources.

Robotics Researcher – Telerobotics Research and Applications Group 2/99-9/02

- *Task Manager:* secured funding for and managed integrated hardware/software research development of a reconfigurable robotic system.
- *Principal Investigator:* developed intelligent software tool for terrain-based analysis of the Martian surface for spacecraft landing
- *Cognizant Engineer*: designed and developed a real-time software package for autonomous rover navigation on hazardous terrain.

Information Systems Engineer - Information Technologies Research Section 1/97-2/99

- Using clustering and neural network techniques, developed software algorithms for identifying ground-based military targets embedded in spectral frequency data.
- Using neural networks, developed vision based recognition algorithms for real-time identification and tracking of airborne targets (ATR).

Computer Scientist - Advanced Technology Section 6/93-12/96

- Using UNIX Based OSF/Motif and the C programming language, created a GUI Toolkit for intelligent manipulation of military tactical groupings.
- Provided real time data analysis of intelligent neural systems for launch vehicle health monitoring through a computer graphics support unit.

TEACHING

Summary: Adjunct professor/lecturer of 5 classes in the computer science and engineering subject area. The number in brackets after each class year is the student evaluation, with comparison to the average. The maximum possible score is 5.00 (excellent).

Lecturer, University of Southern California, Computer Science Department

- Programming on the World Wide Web (CSCI351), Fall 2001 (4.28)
  Introduce students to web programming languages such as JAVA, Perl, and XML. Incorporated an advance section on the use of emerging technologies such as software agents and data mining.

Adjunct Professor, Pasadena City College, Math and Computer Science Department

- Fundamentals of Computer Science (CS-2), Spring 2001
  This class introduces students to the use of algorithms, data structures, and numerical methods in computer science. Lab focuses on programming exercises in C++.

- Introduction to Information Systems (CIS-10), Fall 2000
  This course is a foundation course for IT majors. Computer concepts include overview of programming principles, data integrity and security.

Adjunct Professor, California State University, Long Beach, Engineering Technology Department

- Data Structures (ET486), Spring 2000 (4.6/4.27)
  Advanced course in implementation of appropriate data structures for applications. Includes treatment of arrays, lists, stacks, trees, search and sorting.

- Computer Applications (ET205), Spring 1999, Fall 1999, (4.8/4.25)
  This course is a foundation course for engineering technology majors. Focus is on basic programming in C and an introduction to computer architectures.

VISITING SCHOLAR

May 2004: *ADVANCE Visiting Scholar*, Electrical Engineering Department (Robotics, Automation, Control, and Mechatronics Group), University of Washington. Host: Dr. D. Denton/Dr. E. Riskin.

PROPOSALS FUNDED (11)

Summary: 4 active projects (1 as PI, 3 as CoPI) totaling approximately $*4.0M. 9 completed projects (5 as PI, 4 as CoPI) totaling approximately* $*1.3M. Competed funding sources include DRAPER, NASA, and JPL.*

Current:

1. A Synergistic Approach for Maximizing Human Automation System Performance (HumAnS), Draper University IR&D Program, Principal Investigator, 2004.
2. Multi-Sensor Hazard Assessment and Safe Site Selection, NASA Mars Exploration Program Advanced Technologies, Co-Investigator, 2004.
3. Steep Terrain Access Robot, JPL Research and Technology Development Fund, Co-Investigator, 2003.
4. Guidance, Navigation, and Control (GN&C) Technology for Small Body Proximity Operations and Landing, JPL Research and Technology Development Fund, Co-Investigator, 2003.

Completed:

1. Artificial Intelligence Toolkit to Enhance Understanding and Knowledge, JPL Spontaneous Concepts, Principal Investigator, 2002.
2. Human-Equivalent Navigation for Autonomous Planetary Rovers, NASA Exploration Team (NEXT) Program, Co-Investigator, 2002.
3. Vehicle Subsystem/Autonomous Precision Landing, NASA HEDS, Principal Investigator, 2002.
4. Evolvable, Adaptable, Reconfigurable (EVADR) Software Architecture for Vision-Based Applications, NASA Exploration Team Program, Principal Investigator, 2001.
5. Multi-Sensor Hazard Avoidance, NASA Mars Technology Program, Co-Investigator, 2001.
6. Intelligent Sensors for Planetary Exploration, JPL Spontaneous Concepts, JPL Spontaneous Concepts, Principal Investigator, 2001.
7. Autonomous Reasoning for Safe Landing, JPL Director's Research and Development Fund, Co-Investigator, 2001.
8. Software Tool for Automated Selection of Spacecraft Landing Site, NASA NEXT, Principal Investigator, 2000.
9. Safe Navigation of Planetary Rovers on Challenging Terrains, NASA Cross Enterprise Technology Program, Co-Investigator, 2000.

RESEARCH SUPERVISION

Aryen Alston-Moore, Spelman College, Senior, Computer Science Major, 2004

Adrienne Huffman, Florida A&M University, Junior, Computer Engineering Major, 2003

Gustavo Razo, California State University Fresno, Senior, Computer Science Major, 2003

Eric Rogstad, University of Texas at Austin, Sophomore, Aerospace Engineering Major, 2003

Gabrielle Schafer, University of California Los Angeles (UCLA), Freshman, Cognitive Science Major, 2003

Paul Wes, University of Washington, Sophomore, Computer Engineering Major, 2002

Ashante Allen, North Carolina A&T, Junior, Mechanical Engineering Major, 2002

Paul Stuart, University of Washington, Junior, Electrical Engineering Major, 2001, 2002

Alan Carlson, University of Idaho, 2nd year Masters, Mechanical Engineering Major, 2001

Justin Kao, Caltech, Sophomore, Applied Math Major, 2000

HONORS AND AWARDS

MIT Technology Review Top 100 Young Innovator of the Year (2003)

Lew Allen Award of Excellence for significant technical contributions (2001)

Engineer of the Year Award, Los Angeles Council of Engineers and Scientists (2004)

Allstate Insurance Distinguished Honoree for achievement in science (2004)

San Francisco Airport Museum Honoree, African-American technology trailblazers in Calif. (2002)

NASA Space Act Award for Fuzzy Logic Engine for Space Applications (2004)

NASA Space Act Award for Path Planning Graphical User Interface (2003)

NASA Honor Award for Safe Robotic Navigation Task (2002)

Best Paper Award, 9th International Symposium on Robotics and Applications (2002)

JPL Technology and Applications Program (TAP) Honor Award (2000)

University of Southern California Pre-Doctoral Fellowship (1995-1998)

GEM Masters Engineering Fellowship (1993-1995)

TECHNOLOGY INNOVATIONS (9) (filed by NASA as available for public licensing)

Artificial Intelligence Toolkit to Enhance Understanding and Knowledge, 2003

A Fuzzy Logic Engine for Space Applications, 2003

A Novel Reconfigurable Robot for Navigation on Rough Terrain, 2002
Software for Integrating Terrain Maps into Reactive Navigation Strategies, 2002
Software for Rover Path Planning using Vision-Based Terrain Characteristics, 2002
Path Planning Graphical User Interface, 2001
Cognitive Sensor Technology, 2001
A Software Tool for Real-Time Terrain Classification, 2001
Software for Fuzzy Logic Navigation of Mobile Robots, 2000

SERVICE

Service to the Profession

1. Membership on Editorial Boards
(a) Associate Editor, Int. Journal of Intelligent Automation and Soft Computing, 2000-present

2. Reviewing Research Proposals
(a) NASA SBIR Sub-topic Manager for Mars In-situ Robotics Technology, 2003 – present
(b) Reviewer, Louisiana Board of Regents R&D Grants Program, 2002, 2003
(c) NSF Artificial Intelligence and Cognitive Science Advisory Panel, 2004
(d) Reviewer, NASA NRA Cross Enterprise Technology Development Program (CETDP), 2000
(e) NASA Faculty Awards for Research (FAR) Program, 2002

3. Reviewing Papers for Journals: IEEE Transactions on Robotics and Automation, IEEE Transactions on Mobile Computing, Journal of Intelligent Automation and Soft Computing, Autonomous Robots, EURASIP Journal on Applied Signal Processing

4. Reviewing Papers for Conferences: IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Conference on Advanced Robotics (ICAR)

5. Program Committees
(a) IEEE International Conference on Systems, Man and Cybernetics (SMC), 2005

6. Symposium and Workshop Organization
(a) AAAI Symposium on Accessible Hands-on Artificial Intelligence and Robotics Education Workshop, 2004

7. Other
(a) Board Member, SEEMA, Aerospace Education Academy Advisory Board, 2003 – present

Service to the Organization
1. Board Member, JPL Minority Education Initiatives Advisory Board, 2002 - present
2. Technical Reviewer, JPL Director's Research and Development Fund, 2003
3. Reviewer, NASA Small Business Innovative Research Proposals, 2002, 2003
4. Proposal Reviewer, NASA Graduate Student Research Program, 2004
5. Technical Recruiter, Jet Propulsion Laboratory, 1999-present
6. JPL National Society of Black Engineers Convention Planning Team, 2003, 2004
7. Speakers Bureau, Jet Propulsion Laboratory, 1998-present
8. Council Member, JPL Director's Advisory Council for Women, 1999-2001

Service to Society
1. Board Member (2000-current), Delta Sigma Theta Sorority Inc., Pasadena Chapter
2. Founder, Pasadena Delta Academy (2001-current) - Mentoring program for young teen girls focused on math, science, and technology education.
3. Co-Founder, JUMP (JPL Undergraduate Mentoring Program for Women) (2001-current) - Provides mentoring support to undergraduate engineering students.

4. Executive Board Member, JobStarts, Inc. (1999-2003) - Nonprofit that helps families successfully gain economic stability through work.
5. Engineering Advisor, FIRST (2001-2002) - Nonprofit founded to inspire students through participation in annual robotics competitions.
6. Space Expert, Challenger Center for Space Science Education, Space Day 2002 - Program designed to encourage students through interaction with visiting space experts.
7. Computer Tutor, Restore, Inc. (1998-2002) - Provide computer training for a battered women shelter.

PROFESSIONAL SOCIETY MEMBERSHIPS

Senior Member, Institute for Electrical and Electronic Engineers (IEEE), 1992-present (Member: 1992-2003)
Fellow, Institute for the Advancement of Engineers, 2004-present
Senior Member, Society of Women Engineers (SWE), 2000-present
IEEE Robotics and Automation Society, 1992-present
American Association for Artificial Intelligence (AAAI), 1999-present

SELECTED MEDIA COVERAGE

1. TIME Magazine, "Innovators/Artificial Intelligence: Forging the Future," http://www.time.com/time/magazine/article/0,9171,1101040614-646372,00.html, June 14, 2004.
2. NASA Space Science and Technology, "Robots with Brains," http://www.nasa.gov/missions/science/f_robotics.html, June 2004.
3. PBS Dragonfly TV, "Episodes of Scientific Adventures: Space", http://pbskids.org/dragonflytv, May 2004.
4. NASA Connect Video Series, "PSA: The Astronaut's Helper," http://connect.larc.nasa.gov/programs/2003-2004/psa/index.html, January 2004.
5. National Society of Black Engineers Magazine, "JPL Engineer in a Class of Her Own," January/February 2004.
6. Diversity Careers Magazine, "Dr. Ayanna Howard, JPL Robotics Expert", January 2004.
7. Science Next Wave Online Magazine, "Fuzzy Logic: Adventures in Artificial Intelligence," Nov. 2003.
8. Brown University Daily Herald, "Brown graduate bridges human-machine divide," Nov. 2003.
9. Apogee Book Space Series, "Women of Space: Cool Careers on the Final Frontier," October 2003.
10. MIT Technology Review Magazine, "Top 100 Young Bold Innovators of 2003," Oct. 2003.
11. NASA First Person, "JPL robotics engineer Dr. Ayanna Howard," http://www.jpl.nasa.gov/templates/video/firstperson/howard.cfm, August 2003.
12. ABEST (Association of Black Engineers, Scientists, and Technologist), "Featured Technologist: Dr. Ayanna Howard," http://www.abestonline.org/content.php?cid=1002, July 2003.
13. Educator Astronaut Program, "Meet the NASA Team," http://edspace.nasa.gov/text/earthcrew/ntgallery.html, May 2003.
14. NASA TV Live Interview, "JPL's Mechanical Women: Dr. Ayanna Howard," March 2003.
15. Solar System Exploration Public Outreach Forum, "Teaching Robots to Read the Lay of the Land on Strange New World," http://sseforum.jpl.nasa.gov/students/index.cfm?Display=Profile&Feature=AHoward, 2003.
16. Stacie Meadows, "A Woman on a Mission," MIT NASA Research in Science and Engineering (RISE) Program, http://web.mit.edu/ome/RISE02/present.htm, Aug. 2002.
17. Orbital Intermedia, "Woman's Work," 2002.
18. Imagiverse Online Interview, "An Interview with Ayanna Howard," http://www.imagiverse.org/interviews/ayannahoward/ayanna_howard_16_08_02.htm, August 2002.
19. Airport Museum showcasing inventors whose innovations have contributed significantly to the space program, "NASA African-American Researcher Featured in Airport Museum," http://amesnews.arc.nasa.gov/releases/2002/02_58AR.html, May 2002.
20. Mars Exploration Program, Mars Today, "JPL's Bionic Woman, Dr. Ayanna Howard", http://marsprogram.jpl.nasa.gov/spotlight/ayannaHoward01.html, August 2002.
21. NASA TV Black History Month Live Shot, "Feature: Dr. Ayanna Howard," February 2002.
22. Passport to Knowledge, "Live from Mars," November 2001.
23. NASA Tech Briefs, "Who's Who at NASA", August 2001.
24. Space Daily, "Send in the Robots," http://www.spacer.com/news/robot-01b.html, May 2001.

25. Science@NASA, First Science, "Brainy 'Bots," http://science.nasa.gov/headlines/y2001/ast29may_1.htm, May 2001.

PUBLICATIONS (55)

Summary: 9 refereed journal articles, 28 refereed conference papers, 3 book chapters, and 15 unrefereed publications.

Book Chapters (3)

1. A. Howard, E. Tunstel, "Using Geospatial Information for Autonomous Systems Control," Frontiers of Geographic Information Processing, Eds. Rana and Sharma, Springer Science, 2004.
2. E. Tunstel, A. Howard, T. Huntsberger, A. Trebi-Ollenu, J. Dolan, "Applied Soft Computing Strategies for Autonomous Field Robotics," Fusion of Soft Computing and Hard Computing for Autonomous Robotic Systems, Eds. Zhou, Moravall, and Ruan, vol. 116, pgs. 75-102, Physica-Verlag, 2003.
3. E. Tunstel, H. Seraji, A. Howard, Chapter 11: "Soft Computing Approach to Safe Navigation of Autonomous Planetary Rovers", Intelligent Control Systems Using Soft Computing Methodologies, Eds. Zilouchian and Jamshidi, CRC Press, 2001.

Refereed Journal Articles (9)

1. A. Howard, H. Seraji, "Multi-Sensor Terrain Classification for Safe Spacecraft Landing," IEEE Transactions on Aerospace and Electronic Systems, accepted, to appear October 2004.
2. A. Howard, C. Padgett, "An Adaptive Learning Methodology for Intelligent Object Detection in Novel Imagery Data," NeuroComputing, vol. 51, pgs. 1-11, March 2003.
3. E. Tunstel, A. Howard, "Approximate Reasoning for Safety and Survivability of Planetary Rovers," Fuzzy Sets and Systems, vol. 134, no. 1, pgs. 27-46, Feb. 2003.
4. E. Tunstel, A. Howard, H. Seraji, "Rule-based reasoning and neural network perception for safe off-road robot mobility", Expert Systems, 19(4), pgs. 191-200, Sept. 2002.
5. H. Seraji and A. Howard, "Behavior-Based Navigation on Challenging Terrain: A Fuzzy Logic Approach," IEEE Transactions on Robotics and Automation, 18(3), pgs. 308-321, June 2002.
6. A. Howard, H. Seraji, "An Intelligent Terrain-Based Navigation System for Planetary Rovers," IEEE Robotics and Automation Magazine, vol. 8, no. 4, December 2001.
7. A. Howard, H. Seraji, "Vision-Based Terrain Characterization and Traversability Assessment," Journal of Robotic Systems, 18(10), pgs. 577-587, 2001.
8. A. Howard, G. Bekey, "Intelligent Learning for Deformable Object Manipulation," Autonomous Robots, 9 (1): pgs. 51-58, August 2000.
9. A. Howard, C. Padgett, "A generalized approach to real-time pattern recognition in sensed data," Pattern Recognition, vol. 32:12, Dec. 1999.

Unreferred Magazine Articles (1)

1. A. Howard, G. Bekey, "Robotics Become Capable of Handling a Rubber Ball," Advanced Manufacturing Technology, John Wiley & Sons, Nov. 2000

Refereed Conference and Workshop Papers (27)

1. A. Howard, et. al, "A Reconfigurable Robotic Exploration Vehicle for Extreme Environments," 10th International Symposium on Robotics and Applications, Seville, Spain, June 2004.
2. A. Howard, et. al. "A Methodology to Determine Impact of Autonomy Technologies on Space Science Mission," 10th International Symposium on Robotics and Applications, Seville, Spain, June 2004.
3. A. Howard, E. Graham, "Bridging the Gap between Space Robotics Research and Robotics Education," AAAI Symp. on Accessible, Hands-on AI/Robotics Education, San Jose, CA., pgs. 126-128, March 2004.
4. A. Howard, B. Werger, H. Seraji, "Integrating Terrain Maps into a Reactive Navigation Strategy" IEEE Int. Conf. On Robotics and Automation, Taiwan, pgs. 2012-2017, September 2003.

5. A. Howard, H. Seraji, B. Werger, "A Global Path Planner using the Terrain Traversability Index," Seventh International Conference on Automation Technology, Taiwan, September 2003.
6. A. Howard, G. Rodriguez, "Validating Mission Relevance of Autonomy Technologies through Increased Science Return," Workshop on Machine Learning in Space Systems, 20th International Conference on Machine Learning, Washington, D.C., pgs. 31-35, August 2003.
7. S.Mobasser, C.C.Liebe, A.Howard, "Fuzzy Image Processing in Sun Sensor," International Fuzzy Systems Association World Congress , Istanbul, Turkey, June 2003.
8. A. Howard, H. Seraji, "A Rule-Based Fuzzy Safety Index for Landing Site Risk Assessment," 9th International Symposium on Robotics and Applications, Orlando, FL., June 2002.
9. E. Tunstel, A. Howard, "Sensing and Perception Challenges in Planetary Surface Robotics," IEEE Sensors, Orlando, FL., June 2002.
10. A. Howard, "A Novel Information Fusion Methodology for Intelligent Terrain Analysis," IEEE International Conference on Fuzzy Systems (FUZZ-IEEE), Honolulu, HI, May 2002.
11. C.C.Liebe, S.Mobasser, C.J.Wrigley, Y.Bae, A.Howard, J.Schroeder, "Micro Sun Sensor," IEEE Aerospace Conference, Big Sky, Montana, March 2002.
12. S.Mobasser, C.C.Liebe, A.Howard, "Fuzzy Image Processing in Sun Sensor," 10th IEEE International Conference on Fuzzy Systems, Melbourne, Australia, pgs. 1337-1342, Dec. 2001.
13. S. Mobasser, C.C. Liebe, A. Howard, "Application of Fuzzy Logic in Sunsensor Data Interpretation," 2nd International Conference on Intelligent Technologies (InTech'2001), Bangkok, Thailand, Nov. 2001.
14. A. Howard, E. Tunstel, D. Edwards, A. Carlson, "Enhancing Fuzzy Robot Navigation Systems by Mimicking Human Visual Perception of Natural Terrain Traversability," Joint 9th IFSA World Congress and 20th NAFIPS International Conference, Vancouver, Canada, July 2001.
15. H. Seraji, A. Howard, E. Tunstel, "Terrain-Based Navigation of Planetary Rovers: A Fuzzy Logic Approach," 6th Int. Symposium on Artificial Intelligence, Robotics and Automation in Space, Montreal, Canada, June 2001.
16. A. Howard, H. Seraji, E. Tunstel "A Rule-Based Fuzzy Traversability Index for Mobile Robot Navigation," IEEE Int. Conf. On Robotics and Automation, vol. 1, pp. 3067-3071, May 2001.
17. H. Seraji, A. Howard, E. Tunstel, "Safe Navigation on Hazardous Terrain," IEEE Int. Conf. on Robotics and Automation, Seoul, Korea, pgs. 3084-3091, May 2001.
18. E. Tunstel, A. Howard, H. Seraji, "Fuzzy Rule-Based Reasoning for Rover Safety and Survivability," IEEE Int. Conf. on Robotics and Automation, Seoul, Korea, pgs. 1413-1420, May 2001.
19. C. Padgett, A. Howard, S. Udomkesmalee, "Shape Based Object Recognition Using a Fast Analog Convolution Processor," NASA/DoD Second Biomorphic Explorers Workshop, Pasadena, CA., Dec. 2000.
20. A. Howard, H. Seraji, "Real-Time Assessment of Terrain Traversability for Autonomous Rover Navigation," IEEE/RSJ Intern. Conf. on Intelligent Robots and Systems (IROS 2000), Japan, pgs. 58-63, Nov. 2000.
21. A. Howard, H. Seraji, "A Real-Time Autonomous Rover Navigation System," World Automation Congress, Maui, HI, June 2000.
22. A. Howard, G. Bekey, "A Learning Methodology for Robotic Manipulation of Deformable Objects," 8 th International Symposium on Robotics and Applications, Maui, HI, June 2000.
23. A. Howard, C. Padgett, K. Brown, "Real Time Intelligent Target Detection and Analysis with Machine Vision," 3rd International Symposium on Intelligent Automation and Control, Maui, HI, June 2000.
24. A. Howard, G. Bekey, "Intelligent Learning for Deformable Object Manipulation," IEEE Intern. Symposium on Computational Intelligence in Robotics and Automation, Monterey Bay, CA., Nov. 1999.
25. A. Howard, C. Padgett, K. Brown "Intelligent Target Detection in Hyperspectral Imagery," 13th Applied Geologic Remote Sensing Conference, Vancouver, Canada, March 1999.
26. A. Howard, C. Padgett, C. Liebe "A Multi-Stage Neural Network for Automatic Target Detection," IEEE Int. Joint Conference on Neural Networks (IJCNN), Anchorage, Alaska, May 1998.
27. A.M. Howard, G.A. Bekey, "Recursive Learning for Deformable Object Manipulation," 8th Int. Conf. Advanced Robotics, pgs. 939-943, Monterey, CA., July 1997.

Refereed Conference Posters (1)

1. A. Howard, H. Seraji, B. Werger, “Fuzzy Terrain-Based Path Planning for Planetary Rovers," 9th International Symposium on Robotics and Applications, Honolulu, HI, May 2002.

Unrefereed Conference Proceedings (1)

1. A.M. Howard, G.A. Bekey, “Prototype system for automated sorting and removal of bags of hazardous waste,” Intelligent Robots and Computer Vision XV: Algorithms, Techniques, Active Vision and Materials Handling, Proc. SPIE 2904, pp. 271-277, Boston, MA. Nov. 1996.

Technical Reports (13)

1. A. Howard, “A Fuzzy Logic Engine for Space Applications,” New Tech. Report No. 40461, July 2003.
2. A. Howard, G. Chalfant, E. Rogstad, “Artificial Intelligence toolkit to Enhance Understanding and Knowledge,”,New Technology Report No. 40496, July 2003.
3. A. Howard, et. al,. “A Novel Reconfigurable Robot for Navigation on Rough Terrain,” New Technology Report No. 30890, March 2003.
4. A. Howard, B. Werger, H. Seraji, “Rover Path Planning using Vision-Based Terrain Characteristics,” New Technology Report No. 30744-CP, November 2002.
5. A. Howard, B. Werger, H. Seraji, “Integrating Terrain Maps into Reactive Navigation Strategies,” New Technology Report No. 30794, November 2002.
6. A. Howard, “GUI Program for Planning Paths of Rovers,” NASA Tech Brief, July 2002.
7. A. Howard, E. Tunstel, “Development of Cognitive Sensors,” NASA Tech Briefs, pg. 38, April 2002.
8. A. Howard, “Path-Planning Graphical User Interface,” New Tech. Report No. 30320, June 2001.
9. A. Howard, E. Tunstel, “Cognitive Sensor Technology,” New Tech. Report No. 30283, June 2001.
10. A. Howard, “A Software Tool for Real-Time Terrain Classification,” New Technology Report No. 21234, Feb. 2001.
11. H. Seraji, A. Howard, B. Bon, “Fuzzy Logic Navigation of Mobile Robots,” New Technology Report No. 21199, Dec. 2000.
12. A. Howard, "Recursive Learning for Deformable Object Manipulation,” IRIS technical report IRIS-99-369, University of Southern California, pp. 1-169, 1999.
13. C. Padgett, A. Howard, et al. “Real Time Sub-Pixel Object Detection in Hyperspectral Images,” JPL Doc. D-16150, Sept. 1998.

INVITED TALKS AND PRESENTATIONS (excluding conference paper talks)

1. Panel: “Innovation and Transformation: Big New Ideas,” ideaFestival, Lexington, KY, Sept. 2004.
2. Panel: “The Supersmart Robots are Coming,” Technology Summit for Business Solutions, June 2004.
3. Roundtable: “Presidents’ Roundtable with NASA,“ NASA Tribal College and University Conference, Pasadena, CA. May 2004.
4. Research in Behavior-Based Navigation Strategies for Planetary Robots,” Robotics, Controls, and Mechatronics Colloquium, University of Washington, May 2004.
5. Workshop: “Knowledge Transfer in the Classroom: Bridging the Gap Between Technology and Education…As Only NASA Can,” National Organization for the Professional Advancement of Black Chemists and Chemical Engineers Annual Conference, San Diego, CA., April 2004
6. “Human-Inspired Techniques for Exploring Space,” Mt. Wilson Observatory Lecture Series, CA. April 2004.
7. “Artificial Intelligence for Autonomous Control in Space,”von Karmen Lecture Series, Pasadena, April, 2004.
8. Workshop: “NASA Mars Rover: Behind the Scenes @JPL,” National Society of Black Engineering National Conference, Dallas, TX., March 2004.
9. Keynote Speaker, IBM-sponsored National Black Family Technology Awareness Week, Oakland, Feb. 2004.
10. “Robots for Space Exploration,” Chabot Science Center Distinguished Lecture Series, Oakland, Feb. 2004.
11. “Smart Robots for Space Exploration,” Pacific Science Center Space Lecture Series, Seattle, WA. Dec. 2003.
12. Workshop: “Space Explorers-Exploring the Universe,” Young African American Women’s Conf., Nov. 2003.

13. “Autonomous Systems for Space Exploration,” Astronomy Colloquium, California State University Los Angeles, October 2003.
14. “Robots in Space,” Astronomy Guest Lecture Series, Santa Monica College, CA, May 2003.
15. Workshop: “Going to Mars … JPL Style,” National Society of Black Engineers National Conference, Anaheim, CA., March 2003.
16. Keynote Speaker: “The Souls of Black Folk (100th Anniversary)”, Tinker AFB Black History Month Banquet, Oklahoma, March 2003.
17. “Doing Business with Private and Governmental Space Agencies,” California Space Authority, San Luis Obispo, CA. Feb. 2003.
18. Panel: “Women Working on Mars,” National Engineers Week WebCast, Pasadena, CA, Jan 2003.
19. “Neural Networks, Robotics, Fuzzy Logic, Machine Vision, What’s It All About?” 2nd Annual Careers in Math, Science, and Technology Conference, CA, Jan 2003.
20. “Robotics Research at JPL,” North Carolina A&T Computer Science Colloquium, Sept. 2001.
21. “Robotics and Artificial Intelligence”, Santa Monica City College, March/Sept. 2000.
22. Tutorial: "Hybrid Systems: Effective ways to combine genetic algorithms, neural networks, and fuzzy systems for real-world applications,” World Automation Congress, Maui, HI, June 2000.
23. Tutorial: “Robotics in the 21st Century,” Society of Women Engineers Regional Conference, Santa Monica, Ca, February 2000.

PERSONAL

Citizenship: US

Gender: Female